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NATIONAL CANNERS ASSOCIATION

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Raw Products Research Activities

Mississippi Central Station Reports on Pea, Bean, and Tomato Studies

The central agricultural experiment station of Mississippi State College is supplemented by special-purpose substations and special-problem research units. The Truck Crops Branch Station at Crystal Springs conducts research in commercial truck crops and the experiments reported upon below were conducted at that branch.

TOMATO VARIETIES

Rutgers is the highest yielder for both early and total yields of the 23 varieties and selections tested. Other varieties that ranked high were Louisiana Pink, Essary, Stokesdale, and Marglobe.

The high yields of these varieties were due principally to their partial resistance to fusarium wilt. Of these better varieties, 40 to 75 per cent of the plants were killed by wilt, while Gulf State Market, Asgrow Scarlet Dawn, Clark's Early, John Baer, and other similar varieties were killed to the extent of 75 to 100 per cent. Pan America, a variety recently introduced by the USDA, was highly resistant with no plants killed by wilt in the observation field.

TOMATO BREEDING

Numerous crosses have been made using Summerset as a common parent with Gulf State Market, Louisiana Pink, Marglobe, and Rutgers. Selections from advanced generation progenies have been outstanding in capacity for setting fruit under adverse conditions.

Work is progressing in breeding the high degree of wilt resistance of the Red Currant tomato into commercial strains.

TOMATO FERTILIZERS

Three years' results on rates and analysis of fertilizer applications show that 1,000 pounds of 4-8-4 per acre has been most profitable. In 1941 the above amount, with 1,000 pounds of dolomitic lime, gave as good yield as 1,500 pounds of 4-8-4 per acre without lime. Tung pomace as one-half of the source of nitrogen in 4-8-4 gave equally as good yields as when nitrate of soda was the source in the same fertilizer.

PEA VARIETIES

In the first early group Glacier ranked first with a yield of 268 bushels per acre. Next were Alaska and Wisconsin Early Sweet with 226 and 218 bushels, respectively. The latter two varieties are recommended only for canning and home-garden use. Of the second early group the highest yielding varieties were as follows: Long Podded World's Record, Early World's Record, World's Record, Thomas Laxton, and Dark Podded Thomas Laxton. Progress No.

9, a new dwarf variety, was superior to other similar varieties in earliness and pod type. Gradus Improved, Gradus, Hundredfold and President Wilson were the highest yielders of the midseason group.

PEA FERTILIZERS

Three years of fertilizer analysis and rates-of-application experiments have shown that significant increases in yield were obtained with increased levels of nitrogen up to 76 pounds of nitrogen per acre. This can be supplied most profitably in an application of 1,000 pounds of 6-8-4 or 6-12-4 per acre with a side dressing of 100 pounds of nitrate of soda per acre. In 1941 profitably increased yields were also obtained with increased phosphorus content of the complete fertilizer up to 12 per cent.

BEAN VARIETIES

Bountiful led in a trial of eight varieties of snap beans, followed closely by Giant Stringless Green Pod, Tennessee Green Pod, Black Valentine, and U. S. 5. Henderson's Bush Lima was the highest yielder of three varieties of lima beans tested.

SWEET CORN TRIALS

Leading the yellow hybrids was Ioana hybrid with 893 dozen marketable ears per acre. Other high yielders were Aristogold Bantam 3, and Aristogold Bantam 1. Highest yielding white hybrids were Silvercross 3, Silvercross 2B, and Silvercross 52B. Aristogold Bantam 3 and Silvercross Bantam 2B exhibited less corn earworm damage than the others.

Reference: Fifty-fourth Annual Report of the Mississippi Experiment Station for the fiscal year ending June 30, 1941, State College.

Harvesting and Handling Cranberries

A new bulletin describing in some detail the methods and equipment now used in harvesting, storing, cleaning, and marketing cranberries has just been issued by the U. S. Department of Agriculture. Such methods are, of course, gradually but constantly undergoing change for the dual purpose of improving the ultimate market quality of the fruit and reducing preventable losses. For this reason the relations existing between handling methods and market quality are stressed through the discussion in the bulletin, and attention is focused on the magnitude and sources of losses inherent in each operation. Where procedures are not standardized, the advantages and disadvantages of alternative methods are presented in detail in this publication.

Reference: "Harvesting and Handling Cultivated Cranberries," Farmers Bul. 1882, U. S. Department of Agriculture, Washington.

Annual Wisconsin Report Summarizes Canning Crops Experimental Studies

TRIALS OF NEW TOMATO VARIETIES

For comparison two well-known older varieties of tomatoes, John Baer and Master Marglobe, were included in the list of newer varieties. None of the new tomatoes yielded significantly more than the checks, although two produced slightly more than John Baer and four were ahead of Marglobe. This was in a year when early varieties did not have as much advantage as usual because the tomato-growing season was fairly long at Madison.

An attractive new medium early variety named Marbon—tested for the first time last year—showed a good deal of promise. It yielded a little more than John Baer.

Early Rutgers proved earlier and somewhat more productive than ordinary Rutgers. Both are desirable as to size, shape, color, and plant characters, but five-year trials have shown Rutgers is too late to yield well in Wisconsin during most years.

Gloriana is early and productive, but does not seem to be suitable here because its fruit tends to be rough, cracked, and usually sunscalded, since the sparse foliage offers little shade.

A number of strains proved essentially similar to well-known varieties. Fisher and Pan American resemble Master Marglobe, although the latter yielded slightly more last year. Firesteel is much like Gloriana.

Mingold, which has been grown at this station for two years, is probably the best large-fruited, yellow tomato available in Wisconsin today.

TOMATO SPRAYING

Grow an early variety, fertilize liberally, but don't spray—that seems to be the most reliable formula for success in producing canning tomatoes in Southeastern Wisconsin. Under such a program the John Baer variety made an excellent return of \$105 per acre by September 10, after the costs of fertilizing, picking and hauling were deducted. Spraying reduced the net income \$32 and where the crop had the added handicap of lacking fertilizer the returns went down another \$25.

Mid-season tomatoes paid out only a fraction as well by September 10. The variety Chicago, an improved selection of J.T.D., produced \$28 worth of tomatoes where it was not sprayed and less than \$16 where it was sprayed.

As in experiments of the previous four years, spraying controlled leaf blight and largely prevented leaf-dropping—but the very fact that it did so prevented the crop from maturing early.

Clearly the combination of mid-season tomatoes and spraying means taking a gambler's chance that the weather will allow tomatoes to mature in October.

The hard facts are that in about three years out of five, the tomato-growing season is over by September 10 in Wisconsin—and fruit that is still green then, more often than not is a total loss. Frosts and fall rains both are hazards. It would take a growing season averaging several weeks longer than Wisconsin's to make spraying tomatoes profitable.

HYBRID SWEET CORN STRAINS

Golden Cross Bantam is the best sweet corn now available for canning purposes, as far as Wisconsin conditions are concerned, based on five years of variety-testing work.

Among promising white strains is Silver Cross Bantam, which is the white counterpart of Golden Cross Bantam. This strain has been tested only two years at the Wisconsin Station.

White hybrids of the Country Gentleman type in general are not entirely dependable or satisfactory in Wisconsin.

On the basis of four-year trials, Ioana yields about as much cut corn as Golden Cross Bantam, possibly a little more fodder, and is among the better Golden strains. The kernels tend to be light in color but the quality is good. Drought seems to hit Ioana rather hard, with the result that it does not perform consistently.

Golden Bantam 1406 was promising in 1939 and 1940 and less satisfactory in 1941. It has about the same maturity as Golden Cross Bantam, though is possibly a higher yielder.

Iogent 27 is a Country Gentleman hybrid with good canning quality, excellent fodder, and fair uniformity of both ear type and maturity. Because it is fully two weeks later than Golden Cross Bantam, it may be too late for some parts of Wisconsin.

Illinois 8 x 6 is a Country Gentleman strain with a good cut-off percentage but otherwise with some shortcomings in Wisconsin. Variable appearance in 1941, and quality inferior to that of Iogent 27 and Silver Cross Bantam. Fodder is inferior compared with Iogent 27.

Illinois 5 x 10 was about on a par with Illinois 8 x 6.

Silver Cross Bantam showed good canning quality in the two years it has been tested, excelling all the Country Gentleman strains on trial in 1941.

In addition to these rather well-known strains, four other yellow hybrids were on trial in 1941 only. The performance of Hiawatha, which matures from three to five days earlier than Golden Cross Bantam, was not encouraging. Sachem likewise failed to do well. Aristogold No. 1 matured about the same time as Golden Cross Bantam and showed rather good canning quality. Aristogold No. 2, maturing four days later, produced very good yields of both ears and fodder, but its canning quality was not of the best.

In an attempt to develop more suitable sweet corn hybrids for Wisconsin a breeding program is being carried on which has now developed to such a point that in 1941 it was possible to make canning trials with 20 inbred lines and 12 experimental hybrids. However, it will not be possible to release improved strains until several more years have passed.

FERTILIZERS FOR SWEET CORN

The most striking result to come out of the 1941 trial with sweet corn was that fertilizer paid excellent returns in spite of a drought that held yields to about 60 per cent of what they were in 1940. The best fertilizer application increased yields by 57 per cent at Arlington and 73 per cent at Fox Lake. Increases in the yields of ears usable for canning were even more spectacular, being 138 per cent and 154 per cent at the two locations.

At both Fox Lake and Arlington the best basic treatment was 200 pounds of 3-18-9 per acre placed at the side of the hill at planting time, but there were differences in the effects of various other fertilizing practices.

Minor soil elements were helpful on the Miami silt loam at Fox Lake, but not on Carrington silt loam at Arlington. The Fox Lake results show a 23 per cent higher yield with

minor elements and 3-18-9 than with 3-18-9 alone. The minor elements that gave best results were zinc sulphate at 10 pounds per acre and copper sulphate at five pounds. Benefits from manganese sulphate were doubtful.

A delayed side-dressing of nitrogen improved yields on the Miami soil, but not on the Carrington black prairie soil, which is high in nitrogen. On the latter a side-dressing of potash returned some benefit, although it failed to do so on the Miami soil.

BORON FOR BEETS

Garden beets or sugar beets growing on boron-deficient soil benefit markedly from borax sprays or dusts applied in midsummer, according to work being done at this station. The research workers at present do not recommend that beet growers rely entirely on summer sprays or dusts, but favor borax sprays or dusts for those occasional fields where an application to the soil at seeding time fails to give satisfactory control.

In some cases where table beets are grown on neutral or slightly alkaline fields in Southeastern Wisconsin, the soil requirements for boron may be even more critical than the need for ordinary NPK fertilizer. Applying 200 pounds of 3-12-12 fertilizer per acre at the side of the seed increased yields of table beets only to an insignificant extent, but using fertilizer plus 40 pounds of borax broadcast, or 20 pounds at the side of the row, brought about an additional yield increase of 25 per cent.

At the same time, borax reduced the amount of black spot disease in the beets from 30 per cent on untreated areas to 10 per cent where borax was broadcast and 3 per cent where it was used as a side application.

Broadcasting 300 pounds of muriate of potash at planting time also increased yields. The most effective fertilization program tried last year was 300 pounds of potash and 40 of borax, applied broadcast, and 200 pounds of 3-12-12 at the side of the seed. This program increased yields by 47 per cent over unfertilized areas.

Salts of zinc, manganese and copper did not have any beneficial effects.

Using a heavy rate of seeding—12 pounds of beet seed per acre instead of nine—failed to increase yields, but did increase the value of the crop because it resulted in a higher proportion of the desirable small-sized beets.

CABBAGE INSECT CONTROL

Cabbage worm and cabbage aphid may be controlled with a single insecticidal mixture containing rotenone, nicotine, and sulphur, according to three-year trials conducted in the Racine-Kenosha area. So far no single formula has proved itself best. Results in 1941 were good with a dust made up of 2½ per cent free nicotine, 20 per cent dusting sulphur, 15 per cent derris (containing 5 per cent rotenone, so as to give a 0.75 per cent rotenone content for the mixture) and 62½ per cent of either talc or hydrated lime.

Another good combination was 30 per cent impregnated nicotine dust (Black Leaf 10), 20 per cent dusting sulphur, 40 per cent talc, and 10 per cent derris.

Among sprays, one of the most effective was 3 pounds derris, ¾ pint nicotine sulphate, and 6 ounces of spreader in 100 gallons of water.

These general principles are indicated: (1) Derris root is superior to arsenate of lead for control of both the imported cabbage worm and the diamond back worm. (2) Arsenicals are better than derris for the cabbage looper.

CHERRY YELLOWS

This name has been given to a disease that infects many sour cherry trees in the Door County area, a characteristic symptom being yellowing of the leaves. It is spreading in Door County rather slowly, as virus diseases go, about 3 per cent more trees having become infected each year on the average among 2500 trees in five orchards checked for the past five years. It spreads through the buds and there is evidence that insects play a part.

Among steps that may be taken to control cherry yellows are use of disease-free nursery stock and destruction of any young trees that show the symptoms.

CHERRY LEAF SPOT

It is possible to save one-third the copper sulphate generally used in Bordeaux mixture sprays for cherry leaf spot by using four sprays of Bordeaux mixture made up of three parts copper sulphate, four of hydrated lime and 100 of water instead of the 6-8-100 formula. While 6-8-100 Bordeaux controlled leaf spot, fruit size was reduced about 15 per cent.

In 1941, Bordeaux 3-4-100 in a four-spray program gave about the same results as three applications of 6-8-100, although some years the lower concentrations has not reduced the fruit size as much as the standard treatment.

Bordeaux 1½-2-100 in four applications controlled leaf spot satisfactorily with little injury to foliage and little reduction of fruit size. However, trials in other years have shown this program is not always effective.

Tennessee Copper 34 and high-magnesium lime, 3-3-100, plus 1-800 Orthex, controlled leaf spot without foliage injury and resulted in about 10 per cent larger fruit than the effective Bordeaux treatments.

PEA APHID CONTROL

It is clear by now that many factors help determine the effectiveness of rotenone for control of pea aphid, but three deserve particular attention at this time: (1) the kind of diluent or carrier, (2) the equipment used in applying dusts, and (3) the care employed when dusting.

There are some indications that some canning companies employ incompetent help to dust peas. As a classic example, last summer an operator was observed going through the motions of dusting for two hours with only one side of the boom throwing out dust. When the machine was checked it was found to have pieces of burlap sack, paper, and even a stone in the dust tube. No insecticide can be expected to give good results when applied as carelessly as that.

It is important also to see to it that the apron trailed behind the duster—which is intended to hold the dust on the peas instead of allowing it to float away—really does what it is supposed to do. Simply fastening a rope or chain on the apron often is not enough to hold it down. A better method of weighting the apron down is to use a half-inch pipe, letting it rest across the apron six feet back of the duster. The pipe may be attached to the duster with wires. The fact that a pipe is rigid gives it an advantage over a chain or rope from the standpoint of holding the apron in place.

As for diluents, there are great differences in their suitability for use with rotenone. It seems likely that unadapted diluents are as much responsible as any single factor for lack of success in controlling aphids with rotenone dusts.

The best diluent for rotenone this station has yet tested is a pyrophyllite obtained in North Carolina and sold under the name of Pyrax ABB.

The type of diluent seems to determine whether a rotenone insecticide can be stored successfully. Ground silica apparently is one of the worst in this respect, for rotenone mixed with it deteriorates almost immediately. On the other hand, mixtures made with good diluents have proved effective for aphids even after a year's storage.

For canners who may want to try reduced amounts of rotenone it will be wise to proceed cautiously, since thus far they have been tried only to a limited extent during two seasons. Probably the thing to do is use 0.5 per cent rotenone on limited acreages this year, comparing this treatment with the regular 0.75 per cent. Above all it is important to use a good diluent and apply the insecticide carefully.

If further research and experience bear out the indication that it is possible to control aphids with smaller amounts of insecticide, it will mean a very worth-while saving in the cost of producing canning peas. Moreover, it may help solve the problem of a threatened shortage of rotenone, which is expected to be scarce by 1943 as a result of the war.

Indications have been found that rotenone and nicotine, blended, supplement one another so well that small amounts of each poison are enough to produce good results. Nevertheless, it is not safe to conclude, on the basis of only one year's field trials, that rotenone-nicotine blends are the answer to the demand for better aphid insecticides. The Wisconsin Station cannot recommend such blends for general use in 1942. Among the questions that remain to be determined are how effective the blends may be under the conditions of weather, crop growth and aphid infestation prevailing in other seasons, as well as the effects of various diluents, mixing methods, and storage practices.

BORAX ON PEA FIELDS

There is no reason to believe it would pay Southeastern Wisconsin farmers at present to use borax on the fields they devote to canning peas. On the other hand, there is no need for anyone to worry who wants to plant peas on a field where the year before he used borax to control internal black spot of garden beets. Trials have shown that borax at rates as high as 60 pounds per acre is not likely to injure the next year's pea crop.

FERTILIZERS FOR CANNING PEAS

During each of the four years since an appropriation by the State legislature made it possible for the experiment station to carry on extensive work with canning crops, it has been clear that peas return excellent dividends on a modest investment in fertilizer.

The best fertilizer application on Miami silt loam at Columbus was 200 pounds per acre of 0-20-10, which increased yields 47 per cent. At Randolph, on Carrington silt loam, it took 300 pounds of this fertilizer for best results, but even 200 pounds increased yields by 25 per cent. Using 300 pounds had the advantage of improving the quality of peas at both locations.

It did not pay to use nitrogen in the fertilizer mixture. At Columbus, 3 per cent nitrogen actually reduced the yields somewhat, probably because it stimulated too much plant growth at the expense of pod development.

Never during the four years of this series of trials, have canning peas shown any benefit from the minor elements such as copper manganese, zinc or boron. These elements tended to reduce the yields of peas last year.

PEA VARIETY TRIALS

Canning pea variety trials in 1941 brought out evidence that the Prince of Wales type of late, large-berried pea is more susceptible to a virus disease known as "streak" than are other varieties tested.

Trials were carried out last year at New Holstein, in Calumet county. They should supply fairly reliable evidence on the worth of varieties within each group, but it would not be safe to compare peas of different maturity because of seasonal conditions of heat and rainfall.

Among Alaska varieties, Wisconsin No. 28.57 and Cleveland Alaska yielded best.

Although Early Sweets were planted on the same day as Alaskas, the Ace variety was the only one in the group that yielded as well as Alaskas in 1941.

Mid-season peas showed up well. Canner King yielded best, rather closely followed by Early Perfection, Pride, and Improved Penin in that order.

Stuart Perfection led the late peas, with Perfected Wales and Wisconsin Merit practically equal. Four other Wales type varieties did poorly, apparently because they were severely affected by "streak".

Reference: Fifty-eighth annual report of the Agricultural Experiment Station, University of Wisconsin, Madison. Part II.

Vitamin B₁ Without Value as Fertilizer

Vitamin B₁ (thiamin) has been claimed by persons interested in selling this material to produce considerable increases in plant and flower growth. Experiments conducted by qualified scientific investigators in a large number of laboratories, including that of the Texas Agricultural Experiment Station, have shown that in nearly all cases the application of commercial preparations of vitamin B₁ (thiamin) is without value.

Most green plants synthesize within themselves sufficient quantities of vitamin B₁. Vitamin B₁ also occurs in organic matter in the soil and in organic fertilizers, such as manure and cottonseed meal, and may be absorbed from the soil by the plant.

Vegetables which have not responded to applications of vitamin B₁ include snap beans, beets, cabbage, cauliflower, sweet corn, lettuce, muskmelon, mustard, peppers, radishes, rutabagas, summer squash, and tomatoes.

There is no evidence that other vitamins are of practical importance in increasing the growth of plants or the size of flowers, when applied to the plant or the soil.

Reference: "Vitamin B₁ (Thiamin) and Other Vitamins as Fertilizers," Circ. 95, Texas Agricultural Experiment Station, College Station.